

DETECTION OF TEMPERATURE USING FIBER BRAGG GRATING SYSTEM

Bashir Ahmed Tahir, Fadhali M., Jalil Ali, Saktioto, and Rosly Abdul Rahman

Fiber Optics and Photonics Research Laboratory, Department of Physics, Faculty of Science, Universiti Teknologi Malaysia, 81310, Skudai, Johor, MALAYSIA.

Abstract:

In this study, a fiber Bragg grating sensor is proposed to detect the temperature on the surface of mechanical structure. In particular, we point out that the method is well suited for measuring very small temperature because they are able to withstand in a high temperature environments, where standard thermocouple methods are failed. The sensing principle is based on tracking of Bragg wavelength shifts caused by the temperature change. In this work, fiber grating was placed inside the microwave oven. The temperature was increased with equal increments. The shift in the Bragg wavelength shift of this sensor due to temperature change was obtained from optical spectrum analyzer. The wavelength shift of this sensor due to temperature change is 10.5pm/C equal to that of general FBG. Furthermore, the correlation of theoretical calculation and experimental results show the capability and feasibility of the purpose technique. Consequently the practical used of this sensor has been confirmed. This method can also be useful monitoring the flow allocation on production wells, fire detection, steel building, tunnels, leak detection and temperature monitoring of reactor vessels, flare stacks, power line. Therefore, it is expected that the fiber Bragg grating sensor, because of its uniqueness in many aspects and being at an affordable cost, has an excellent prospect in temperature measurements.